CLAIMS

What is claimed is:

1. A method for identifying a material, comprising:

casting an incident photon beam on the material; and

detecting an emerging photon beam with an array of fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles, wherein the array of fission-fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles are sensitive to different ranges of photon beam energy.

2. The method of claim 1, wherein identifying the material comprises detecting the material in a container.

3. The method of claim 1, wherein detecting the emerging photon beam with the array of fission-fragment detectors comprises detecting a photon beam energy in a range between about 10 to 20 MeV.

4. The method of claim 1, wherein detecting the emerging photon beam with the array of fission-fragment detectors comprises detecting the emerging photon beam with a tunable array of fission-fragment detectors.

5. The method of claim 4, wherein detecting the emerging photon beam with the tunable array of fission-fragment detectors includes using a target of atomic number substantially similar to the atomic number of the material.

6. The method of claim 1, wherein detecting the emerging photon beam with the first set of scintillator paddles comprises detecting a photon beam energy in a range up to about 6 MeV.

7. The method of claim 1, wherein detecting the emerging photon beam with the second set of scintillator paddles comprises detecting a photon beam energy exceeding about 6 MeV.

8. The method of claim 1, further comprising using a data acquisition and processing system to process at least one signal from the array of fission-fragment detectors, the first set of scintillator paddles, or the second set of scintillator paddles.

9. The method of claim 8, further comprising creating a histogram of the signal.

10. A photon beam flux monitor for resolving a high-energy beam, comprising:

an array of fission-fragment detectors for measuring a first range of photon energies;

a first set of scintillator paddles coupled to the array of fission-fragment detectors for measuring a second range of photon energies;

a convertor coupled to the first set of scintillator paddles; and

a second set of scintillator paddles coupled to the convertor for measuring a third range of photon energies.

11. The photon beam flux monitor of claim 10, wherein the first, second and third range of photon energies overlap.

12. The photon beam flux monitor of claim 10, wherein the first, second and third range of photon energies do not overlap.

13. The photon beam flux monitor of claim 10, wherein the array of fission-fragment detectors comprises an array of tunable fission-fragment detectors.

14. The photon beam flux monitor of claim 10, wherein the array of fission-fragment detectors is sensitive to a photon energy of about 10 to 20 MeV.

15. The photon beam flux monitor of claim 13, wherein the array of tunable fission-fragment detectors comprises a target.

16. The photon beam flux monitor of claim 14, wherein the target comprises a film of

^{238}U.

17. The photon beam flux monitor of claim 10, wherein the first set of scintillator paddles is sensitive to a photon energy in a range up to about 6 MeV.

18. The photon beam flux monitor of claim 10, further comprising a first set of photo-multiplier tubes coupled to the first set of scintillator paddles.

19. The photon beam flux monitor of claim 10, wherein the second set of scintillator paddles is sensitive to a photon energy exceeding about 6 MeV.

20. The photon beam flux monitor of claim 10, further comprising a second set of photo-multiplier tubes coupled to the second set of scintillator paddles.

21. The photon beam flux monitor of claim 10, wherein the convertor is a lead convertor.

22. The photon beam flux monitor of claim 10, wherein the convertor is operable to produce electron/positron pairs.

23. A photon interrogation system, comprising:

an electron beam generator;

a radiator coupled to the electron beam generator;

an electron stopping block coupled to the radiator; and

a photon beam flux monitor in operative relation with the electron stopping block, the photon beam flux monitor comprising:

an array of fission-fragment detectors;

a first set of scintillator paddles coupled to the array of fission-fragment detectors;

a convertor coupled to the first set of scintillator paddles; and

a second set of scintillator paddles coupled to the convertor.

24. The photon beam flux interrogation system of claim 23, further comprising a data acquisition and processing system coupled to the photon beam flux monitor.

25. The photon beam flux interrogation system of claim 23, wherein the array of fission-fragment detectors comprises an array of tunable fission-fragment detectors.

26. The photon beam flux interrogation system of claim 25, wherein the array of tunable fission-fragment detectors comprises a target.

27. The photon beam flux interrogation system of claim 26, wherein the target comprises a film of ^{238}U.